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ACUTA eNews June 2002, Vol 31, No. 6

The Association for Communications Technology Professionals in Higher Education

June, 2002

eNEWS

Vol. 31, No. 6 Addressing Voice, Data, and Video Communications Needs for Higher Education

Oregon University System Wins Qwest Rate Case

Dave Barta
University of Oregon

The old saying goes, "You can't fight City Hall," and it can seem just as daunting taking on an RBOC in a statewide rate case; but Tim Johnston from Portland State University (PSU), Shay Dakan from Oregon State University (OSU), and I did just that, and in May we received a $450,000 refund. The result came after two years of vigilance and struggle and was achieved with the help of TRACER (Telecommunications Ratepayers Association for Cost-based and Equitable Rates), a watchdog group of large Oregon telecommunications users.

Our small victory was actually the final skirmish in a five-year struggle begun in 1997 when the Oregon Public Utility Commission (OPUC) ordered US West, now Qwest, to refund $270 million to Oregon ratepayers for various service overcharges. Through TRACER we monitored the negotiations and in particular the methodology for returning the overcharges to the ratepayers.

Qwest and the PUC had agreed to refund roughly $300/circuit to each user. We guessed that in order to implement the refund, Qwest would have to pick a code in their billing system as a marker to which to attach each refund. We were concerned that they would pick the code used for Universal Service Fund (USF) charges since there are USF charges associated with all the circuits receiving refunds. However, we are ISDN-PRI users, and USF charges are applied to this service only at a ratio of 5:23 rather than to each bearer channel. If this ratio were used for the refund, we would not get our fair share. Our past experience had shown that most Qwest staff were not normally aware of this anomaly.

Through TRACER we filed formal hearings with questions to both Qwest and OPUC staff asking if the ratio of refunds to ISDN-PRI channels would be 1:1, and they said yes. We also asked our Qwest account team to give us an estimate of our refund, and their figures indicated a 1:1 ratio. Given these assurances, we were shocked in October, 2000, to receive a 5:23 ratio refund at UO and no refund at PSU and OSU.

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Univ. of Oregon System...

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Qwest acknowledged that PSU and OSU had received no refund because their service was delivered by OC3 and that should not have impacted the initial calculation. However, they defended the 5:23 ratio as appropriate even though they initially appeared mystified that it had happened at all.

Through TRACER we filed a formal complaint and began the process of presenting evidence, questions, and rebuttals to an administrative law judge. The search for equity was complicated by the fact that the refund pool had already been sent back to the ratepayers except for a contingency fund of $6.9 million. But Qwest calculations showed that, across the state, there were approximately 1,900 ISDN-PRIs in use, and it would take over $10 million to properly reimburse all of them. Neither Qwest nor the OPUC liked the notion of going back to all the ratepayers and taking a little bit of their refund back in order to correct the mistake.

For several months we exchanged documents and proceeded toward the final hearing with the judge, but at the eleventh hour Qwest agreed to our original proposal to liquidate the contingency fund for the purpose of making ISDN-PRI customers as whole as possible, the OPUC staff concurred, and the judge agreed.

Between us we spent hundreds of hours on the effort, and there were times that it seemed frustrating, especially given that Qwest is one of our primary vendors, and we'd much rather be partners than opponents. But the $450,000 was satisfying, ISDN-PRI customers across the state benefited from our efforts, and in a side agreement Qwest agreed to pay 80 percent of our attorney fees.

Contact Dave Barta at dbarta@oregon.uoregon.edu

ACUTA Looks Strategically at the Future

From the President

Maureen Trimm
Stanford University

Since last fall, the ACUTA Board of Directors has been engaged in a strategic-thinking process. Past ACUTA Boards have diligently conducted strategic-planning processes that have resulted in detailed action plans with assignments to committees, staff, and task teams for accomplishment. This year, we decided to take a longer-term view of planning, and try to visualize ACUTA's success for the next decade, including the bold steps necessary to reach those goals.

The strategic-thinking process started with defining core ideology, which describes ACUTA's identity in 2 parts: (1) its core purpose or reason for being and (2) its core values, which are consistent and enduring guiding principles of the association. From those statements, we tried to envision a future with a 10- to 30-year planning horizon. That envisioned future is a concrete, yet unrealized, vision for the organization. Then we worked on defining "mega-issues" of strategic importance that represent challenges we project in achieving the envisioned future. These mega-issues will become the focus of many upcoming Board meetings as they represent a set of challenges and choices that ACUTA will face.

Only then did we start to work on goals and objectives. These goals have a 3- to 5-year horizon, and many are stretch goals that may represent directions, services, and resource commitments.

The complete plan will be made available in coming months on the ACUTA Web site as the Board completes the planning process with the definition of action plans to reach stated goals and objectives. However, the Board has confirmed the initial parts of the plan. We would like to share some of the more important results of this process with you.

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ACUTA Core Purpose:

To support higher education institutions in achieving optimal use of communications technologies

ACUTA Core Values:

- Sharing of information, resources, and insight
- Respect for the expression of individual opinions and solutions
- A commitment to professional development and growth
- Advancing the unique value and needs of higher education communications technologies
- Encouraging volunteerism and individual contribution of members in support of organizational goals

ACUTA Envisioned Future:

- To be an indispensable organization to which all higher education institutions belong
- To be acknowledged as an invaluable source of leadership in advancing communications technologies in education

ACUTA 3- to 5-year Goals:

1. ACUTA institutional and corporate membership will increase.
2. Data communications professionals will look to ACUTA for insight and information.
3. ACUTA will be a recognized leader in communications technologies.
4. ACUTA will be a recognized source of insight into legislative/regulatory affairs in communications technologies.
5. New technologies and applications will be developed to serve the higher education community.
6. Member representatives will have the skills and abilities to succeed in a changing technology environment.

Does all this sound like what you think of your association, and where you think it can be going? ACUTA is in a great, steady state today with stable finances, a nimble governance structure, high member retention, excellent ratings for its programs and member value proposition. However, in the world of change which we face each day, "steady" doesn't cut it. Only by growing and changing will ACUTA be your association of choice 5 years from now, as your needs and expectations also change. ACUTA has a strong past to build upon and an envisioned future that is reachable.

Board Report

May

The ACUTA Board of Directors met at the Spring Seminar in Philadelphia April 27 and 28. Following are highlights of that meeting.

The Board met with Kermit Eide, strategic planning consultant, to discuss "knowledge based governance" and the next steps for development of the strategic plan.

Reports from the various committee chairs were submitted and discussed. The Secretary/Treasurer and Eleanor Smith presented the proposed budget which was discussed and approved.

A new tag line was adopted: "The Association for Communications Technology Professionals in Higher Education."

Respectfully submitted,

John Bradley
Rensselaer Polytechnic Institute
ACUTA Secretary/Treasurer

Unintended Consequences of High-Efficiency Lighting

Steve Stroh
Broadband Properties Magazine

This article is condensed and reprinted with permission from the April 2002 issue of *Broadband Properties*, page 36. (http://www.broadbandproperties.net)

A new type of lighting system called *radio frequency*, or *RF lighting*, is being developed. It is claimed that RF lighting devices will consume much less electrical power for an equivalent amount of light than current lighting technologies. The potential power savings of RF lighting came to prominence during the California power shortages in summer 2001.

RF lighting works by eliminating the need for a filament or electrode, or a *raw* electrical discharge, as is the case with current lighting systems. The *excitation* of light-producing elements is done with radio frequency energy instead of electrical energy. In addition to substantial energy savings, other potential benefits of RF lighting may be much longer lifetimes and consistency in color or brightness over the lifetime of an RF lighting system. For more information on the technology of RF lighting systems, see http://www.fusionlighting.com/technology.htm.

The Interference Problem

There is a potential problem with RF lighting, especially in multi-tenant buildings, that building managers and developers should be aware of. The radio frequency energy used in RF lighting systems is emitted within the popular 2.4 GHz band used by, among many other devices, wireless local area networks (WLANs, often referred to as Wi-Fi devices) and the newest generation of cordless phones. Tenants who are using such devices may well find them completely non-functional if building management (or other tenants) install RF lighting systems in close proximity to tenant areas.

WLANs and 2.4 GHz cordless phones are proving to be very popular among technology-savvy consumers. With multiple-computer households becoming more common, the need has arisen to share high-speed Internet connections, printers, and other devices among members of the household who each have their own computers. WLANs, while not exactly easy to set up, are easy enough that they're proving to be a popular solution to the computer-sharing problem. The primary alternative for computer sharing is to drill holes and run network cabling, or use phone-line networking, which is, of course, only usable where there is a phone jack.

Interference with WLANs and 2.4 GHz cordless phones arises occasionally when microwave ovens are used near cordless phones. Microwave ovens also emit radio frequency energy within the 2.4 GHz band. However, microwave ovens adhere to strict emission limits. (For the most part, the RF energy is confined to the inside of the microwave oven; if it weren't, the high-powered microwave signals could cause eye damage). Microwave ovens also operate sporadically—rarely for more than a few minutes at a time. RF lighting devices, on the other hand, will likely be turned on continuously, resulting in continuous interference.

The Big (Potential) Interference Issue Surfaces

This potential conflict of uses of 2.4 GHz first came to light in 1999 when vendors of wireless LANs filed position papers with the FCC. More recently, the RF lighting potential interference issue surfaced in an August 6, 2001 article in the *Wall Street Journal* titled "Energy-Saving Light-Bulb Maker Battles With Satellite-Radio Firms For Bandwidth." The article dealt with the concerns of two companies that (then) planned to offer satellite-based broadcast radio - Sirius Satellite Radio, Inc., and XM Satellite Radio (which is now in limited operation). At issue was the amount of interference that Fusion Lighting, Inc.'s proposed new RF lighting devices would cause to the satellite radio broadcasts at 2.32-2.345 GHz, which are considerably removed from the spectrum where Fusion's devices operate—the 2.4 GHz band. The satellite radio broadcasters have concluded that Fusion's devices, as proposed, will cause substantial interference to their transmissions.

Left unmentioned in the WSJ article, and only now beginning to be noted by many users of the 2.4 GHz band, is that if the Fusion devices are capable of

causing such trouble for satellite radio broadcasting, what would the effect be to communications users of the 2.4 GHz band? Likely devastating RF lighting devices could become as widely deployed as light bulbs with each one a source of interference in the 2.4 GHz band.

The potential interference issue is not just limited to individual offices or apartments. High profile (and highly profitable) tenants may well consider the use of wireless technology essential to their use of leased space. One example is Starbucks, which offers Internet access via wireless LANs at many of their company-operated locations. Such "public wireless access points" are becoming ubiquitous, and some analysts project that PWAPs, deployed in public spaces such as airports, hotels, and many other locations, may well displace the role envisioned for mobile telephone 3G wireless data services.

What To Do

Currently, RF lighting devices are not approved for general use, so the problem is only a potential one at present. But looking ahead, it seems likely that RF lighting will be approved in some form. The potential power savings alone could justify the initially high prices for RF lighting devices.

Even if building management chooses not to install RF lighting, interference could still be an issue if tenants install RF lighting, which could then interfere with another tenant's WLAN or cordless phone. It's a somewhat humorous but potentially very real possibility that building management would be called on to resolve a radio frequency interference complaint between tenants.

One solution—or salvation—is that in the next few years, WLAN systems will likely begin to migrate higher in the spectrum to 5 GHz, where there is much more spectrum available (and WLAN speeds will be higher). Currently, 5 GHz WLAN equipment is expensive, but intense competition is beginning, and 5 GHz WLAN equipment will likely be considered affordable within two years.

Cordless phones are also likely migrating to 5 GHz spectrum along with WLANs. Likely the cordless phone migration will be slower due to greater cost-sensitivity by cordless phone buyers and range issues (though technology to enable greater 5 GHz range is evolving rapidly).

Of necessity, building managers increasingly need to become familiar with wireless technology that will be used inside their buildings. Just as "bad cellular telephone coverage" can become an issue with tenants, WLAN and cordless phone interference could also become an issue with tenants and potential tenants. It's possible that future tenant leases will include disclaimers such as "This building makes use of RF lighting systems, and may render the use of devices such as wireless local area networks and cordless phones inoperable." To many building managers, the inclusion of such language may sound laughable, but it wasn't that long ago that cigarette smoking was considered an inalienable right, and any suggestion that smoking wasn't permitted in one's office or apartment would have been considered equally laughable.

About the Author

Steve Stroh is an Independent Technology Writer based in the Redmond, Washington area. Steve is Editor of Focus On Broadband Wireless Internet Access, and has specialized in writing about Broadband Wireless Internet Access since 1997. More information about Focus can be found at http://www.strohpub.com/focus.htm. Steve can be contacted via e-mail at steve@strohpub.com with questions or comments.

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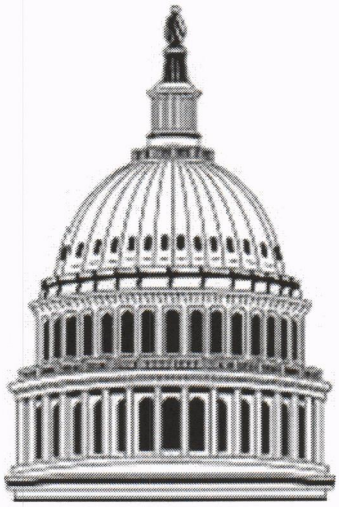

D C Update

Whitney Johnson, Retired
Northern Michigan University

Thanks to Randy Hayes, Chair of ACUTA's Legislative and Regulatory Affairs Committee, for the information provided for DC Update this month in Whitney Johnson's unexpected absence. Whitney says he is feeling fine after surgery following a fall and will be back at his desk very soon.

Supreme Court Overturns 8th Circuit Decision on TELRIC

On May 12th, the U.S. Supreme Court overturned decisions by the 8th Circuit Court of Appeals on TELRIC (total element long-run incremental costs) and UNE (unbundled network elements) issues, upholding rules implemented by the FCC.

In essence, the FCC had indicated pricing for ILECs in providing certain services to CLECs should not be based on historical data that could include highly inefficient or cross-subsidized methodologies. Rather, the FCC stated costs should be based on a "forward-looking" model which would reflect potentially hypothetical but most-efficient costs. The ILECs believed the historical model, including built-in costs of capital expenditures, would be more appropriate. In years of legal wrangling, the 8th Circuit Court of Appeals handed the FCC a major setback, siding primarily with the ILECs. However, the FCC, believing their methodology was sound, appealed the issue to the Supreme Court. That court agreed with the FCC, stating the terms "just and reasonable" and "costs" provided the FCC sufficient latitude to establish the methodology it had chosen.

In addition, in a more debatable decision, the Supreme Court sided with the FCC on rebundling of network elements. With the ILECs having to unbundle the network elements for their services so CLECs could pick and choose what they wanted to offer their customers, the ILECs indicated they did not have to repackage or rebundle these items for the CLECs. The FCC stated the ILECs would indeed have to rebundle the items, and the Supreme Court upheld the FCC's thinking.

Proponents of the court decision state costs to CLECs will be lower, helping them to gain in the marketplace and ultimately passing these savings on to customers. Opponents indicate the decision will force ILECs to sell their services below cost to the CLECs and could discourage facilities-based competition.

Supreme Court Nixes Anti-Porn Law; Bush to Try Again

In April, the Supreme Court threw out substantial portions of the 1996 Child Pornography Prevention Act, specifically regarding computer-generated depictions of child pornography. Shortly after, the Bush administration had a new bill introduced that is more detailed and potentially less liable to fall under the Supreme Court.

While child pornography was determined in 1982 not to be under First Amendment protections, the issue of computer-created/generated depictions of pornographic situations (not real children) became an issue regarding the 1996 CPPA. In essence, the Supreme Court ruled that the portions of the CPPA dealing with computer-generated depictions were too broad and unconstitutional.

SBC Pacific Bell Warns of Increased Local Service Slamming

Recently, SBC Pacific Bell issued an alert to customers regarding what appears to be an increase in attempts to slam local telephone service. In its press release, the company indicated they have experienced a substantial increase in the number of customers who complain that door-to-door and telephone salespeople have tried to get them to switch to a

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ACUTA members may read about the latest developments in telecommunications- and Internet-related issues in the most recent **Legislative and Regulatory Update,** an electronic newsletter prepared monthly by Wiley, Rein & Fielding. Access this newsletter at http://www.acuta.org/relation/DownloadFile.cfm?docNum=309

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different local exchange carrier, citing any number of stories that aren't true. One of the primary stories has been that SBC Pacific Bell is leaving that local area and that another local telephone provider will be stepping-in to provide local service.

Pac Bell offered a number of tips to its customers, such as requesting identification, call-back numbers for verification, reading the entirety of any agreement they are requested to sign, ask questions, educate family members, check with SBC Pacific Bell, and also ask customers to trust their own instincts about claims from salespeople.

California PUC Fines MCI WorldCom $8.5 Million for Slamming

In early March, the California Public Utilities Commission (PUC) announced a major settlement with MCI WorldCom over slamming allegations.

With the April 7th approval of a Superior Court Judge, the settlement essentially fined WorldCom $8.5 million in penalties and reimbursements to customers. The settlement was the result of a suit filed in July 2000 by the California Attorney General's Office, after an investigation of thousands of slamming and cramming complaints against MCI.

In addition to the fine and reimbursement provisions as well as customer service representative training programs, WorldCom agreed to track and resolve complaints from California consumers. The company agreed to clearly disclose information to its consumers regarding rate restrictions (whether time-of-day, intrastate/interstate, etc.); mandatory monthly minimum charges and fees; charges and rates for 10109000 directory assistance and call completion services, as well as its dial-around services; restrictions regarding airline frequent flier mileage for use of long distance services; and the basis of claims for rate comparisons or savings comparisons with other carriers.

FCC Grants VoiceStream Waiver for Wireless Priority Access

On April 3rd the FCC announced that it had provided VoiceStream a temporary waiver so it could initiate a wireless priority access service (PAS) for use in emergency situations. The waiver allows VoiceStream to implement pilot programs in New York City and Washington, D.C., as early as this month. The waiver was necessary so VoiceStream could side-step some FCC rules regarding providing common wireless services in getting an emergency system pilot implemented as soon as possible.

The service will be considered a part of the federal National Communications System, and if successful, will be expanded to other carriers and other locations. The service will essentially guarantee that wireless use by national security and emergency services personnel will not be impeded during an emergency, no matter the amount of traffic or attempted traffic on wireless systems.

FCC Adopts Order Improving E911 Calls from Non-Service Cell Phones

In late April, the FCC adopted an Order to improve the ability for public safety answering points (PSAPs) to respond more quickly and efficiently to E911 calls made from non-service-initialized cell phones.

Non-initialized cell phones are those that are not registered for service with a wireless provider, but can be used to dial 911 (your old cell phone, those donated to providers and distributed to domestic abuse programs, etc.). Currently, these telephones do not register a callback number when E911 is dialed. In this Order, the FCC took the following actions:

- Determined and understood that currently capabilities do not allow carriers to provide an operational call-back number from non-initialized cell phones;

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DC Update

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- From the above, the FCC will require non-initialized handsets provided by carriers to domestic-abuse type programs to have the bogus number 123-456-7890 programmed so a PSAP receiving a call from one of these cell phones would know they cannot place a callback call, and to hopefully make sure they get location information, etc.;
- The FCC will require non-initialized phones provided by carriers to have a label or sticker to alert the user of the non-callback nature of the cell phone;
- Require public education programs by carriers and manufacturers to more fully inform users of the limitations of non-initialized cell phones.

MultiTech Offers Info on VoIP, VPNs, and Remote Access

A recent print ad from MultiTech Systems prompted me to go to their Web site to download some pretty good material on VoIP, VPNs, and Remote Access. I need all the information I can get my hands on to understand some aspects of telecom technology as it increasingly converges with IT technology. To download these documents, go to http://www.multitech.com, or call 877-TRY-VOIP.

Good Broadband Book Available Online

If you've been reading about the various aspects of broadband recently, from the Tauzin-Dingell Act to the debate over the best methodologies to use in expanding broadband, a new book available online is just what is needed to navigate through all of the issues.

Entitled "Broadband: Bringing Home the Bits," the book examines the technologies, economics, policies, and strategies associated with broadband connectivity. The book also makes recommendations to foster broadband deployment. The book was supported primarily by the Defense Advanced Research Projects Agency and the National Science Foundation, with a number of other groups in secondary support roles.

I've started reading this book and find it very, very interesting. It's giving me a good understanding of almost all aspects of the broadband issue. It is essentially a very detailed broadband primer, and I would recommend it as a must-read.

To download this book, go to http://books.nap.edu/html/broadband.

The Web Site Recognition Task Force congratulates the two schools selected for this quarter for having outstanding sites that exemplify the best of Web-Based Directory Services.

California State University - Fullerton

http://www.fullerton.edu/phonebook/index.asp

http://www.fullerton.edu/campusmap/index.htm

University of Western Ontario

http://westerndirectory.uwo.ca

The topic for the next quarter will be "Use of Audio/Video/Animation."

Nominations are due by August 1.

Jeri Semer, CAE
ACUTA Executive Director

From ACUTA Headquarters

Welcoming the *ACUTA eNews* plus Unauthorized Charges Update

I am very excited to be writing this first column for the totally online *ACUTA eNews*. A great deal of thought, planning, and research into our members' needs and preferences regarding the monthly *ACUTA News* went into the decision to make the transition from printed newsletter to this online publication. The decision was based on a number of factors, including cost, timeliness, and the widespread acceptance of online publications in the higher education and technology fields. We hope that the format and content of this new publication meet with your approval. If you have suggestions, please let us know. We plan to do a careful evaluation of the online newsletter at the end of this year, and will make modifications as needed for improvements.

I would like to thank the Publications Committee under the guidance of Chairman James Cross of Michigan Tech and Pat Scott, ACUTA Communications Manager, for their tremendous effort on this project. Aaron Fuehrer, ACUTA Computer Services Manager, has also played an important role in bringing this project to a successful conclusion.

Unauthorized Charges

In other important news, ACUTA has been working for more than a year with a telecommunications industry group known as the Ordering and Billing Forum (OBF), part of the Alliance for Telecommunications Industry Solutions (ATIS). Our goal has been to work with the industry to achieve solutions to the problem of unauthorized charges appearing on college and university telephone bills for things like monthly calling plans, clubs, and other miscellaneous services.

OBF has approved a two-pronged approach to solving this problem after lengthy negotiations. OBF members include IXCs, incumbent LECs, CLECs, billing aggregators, and other providers of telecom services.

The first part of the solution is *bill blocking*, a feature that currently exists within the telecommunications industry that allows an institution to request that their local carrier implement bill blocking for miscellaneous charges on specific accounts. When bill blocking is implemented, no miscellaneous charges may be billed to the account. Unfortunately, this is not a 100% effective solution, because not all carriers have chosen to implement this feature. ACUTA feels strongly that every carrier and service provider should offer this feature to its customers. We will continue to urge them to do so.

The second proposed solution involves the creation (by ACUTA) of a Web-based database of college and university telephone numbers. Telecommunications companies could use this Web site to identify those lines that are pre-subscribed and, therefore, should not be provisioned by another carrier. The concept being explored is that ACUTA would create the database, individual institutions would enter and maintain listings of their own telephone number ranges, and carriers (with appropriate security measures) would use this information to identify those lines that should not receive any charges.

While there are many policy and operational issues still to be studied, the ACUTA Board of Directors has agreed to support the concept of further discussion and development of a pilot project. Please stay tuned for more information as this project progresses. We are hopeful that, if it comes to fruition, it will allow ACUTA to provide a valuable service to the higher education community.

31st Annual Conference
July 14-18, 2002
Reno/Lake Tahoe, NV

Have You Registered Yet?

PaeTec to Sponsor ACUTA Ruth A. Michalecki Leadership Award 2002

ACUTA is pleased to acknowledge PaeTec Communications as the first sponsor of the ACUTA Ruth A. Michalecki Leadership Award. This award was established last year as the Leadership Award and named this spring for the late Ruth Michalecki, former ACUTA President from the University of Nebraska, who passed away in January. ACUTA appreciates all of our corporate sponsors, who contribute meaningful content and valuable underwriting to ACUTA seminars and conferences.

Welcome New Members

Institutional Members

California State University, Hayward, CA

Judy Miller, 510/885-3682. T4 ..... http://www.csuhayward.edu

Florida Gulf Coast University, Fort Myers, FL

Kathleen Davey, 239/590-7072. T2 ..... http://www.fgcu.edu

Friends University, Wichita, KS

Barbara Parks, 316/295-5125. T2 ..... http://www.friends.edu

Morgan State University, Baltimore, MD

Michelle Carter, 443/885-3900. T2 ..... http://www.morgan.edu

Saint Joseph's College of Maine, Standish, ME

Gayle Langis, 207/893-7850. T1 ..... http://www.sjcme.edu

Southern Illinois University-School of Medicine, Springfield, IL

Gloria Pacha, 217/545-1010. T1 ..... http://www.siumed.edu

Corporate Affiliate Members

COPPER MEMBERS

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Michael Case, 607/358-1000 ..... http://www.hunt-eas.com

Whether you plan to build a new school, modify an existing building, or add computer technology, we have professionals you need to achieve your goals. Hunt can provide needs analysis, network design and implementation, security, disaster recovery, and more.

Interactive Intelligence, Inc., Indianapolis, IN

Chris Bell, 317/715-8322 ..... http://www.inin.com

Interactive Intelligence is a global developer of unified communications software designed to increase productivity and improve customer service. The company was founded in 1994 and has more than 950 customers worldwide.

JDM Systems, Inc., Merrimac, MA

Jamshed Daroga, 978/346-7881 ..... http://www.jdmsystems.net

JDM Systems provides telecommunications consulting, systems development, and integration solutions that help leverage new IP contact center strategies and technologies. JDM assists customers in developing their communications architecture and helps in planning for technologies such as VoIP.

Nextel Communications, Inc., Reston, VA

Chris Hackett, 917/577-6574 ..... http://www.nextel.com

Nextel offers a unique four-in-one technology, with digital wireless cellular service, Nextel Direct Connect® two-way radio service, wireless Internet, and Two-Way Messaging capabilities, for businesses to leverage Nextel's nationwide 2.5G wireless network.

Vantage Technology Consulting Group, Manhattan Beach, CA

Phil Crompton, 310/536-7676 ..... http://www.vantagetcg.com

Vantage provides a complete set of technology consulting and design services, with extensive experience in masterplanning, project management, technology infrastructure design, network architecture, conventional and converged voice systems, audiovisual systems, multimedia distribution, videoconferencing, and visualization.

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